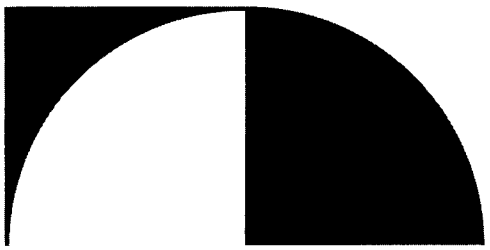
NAKA-00024



Nakamichi 1000

Operating Instructions

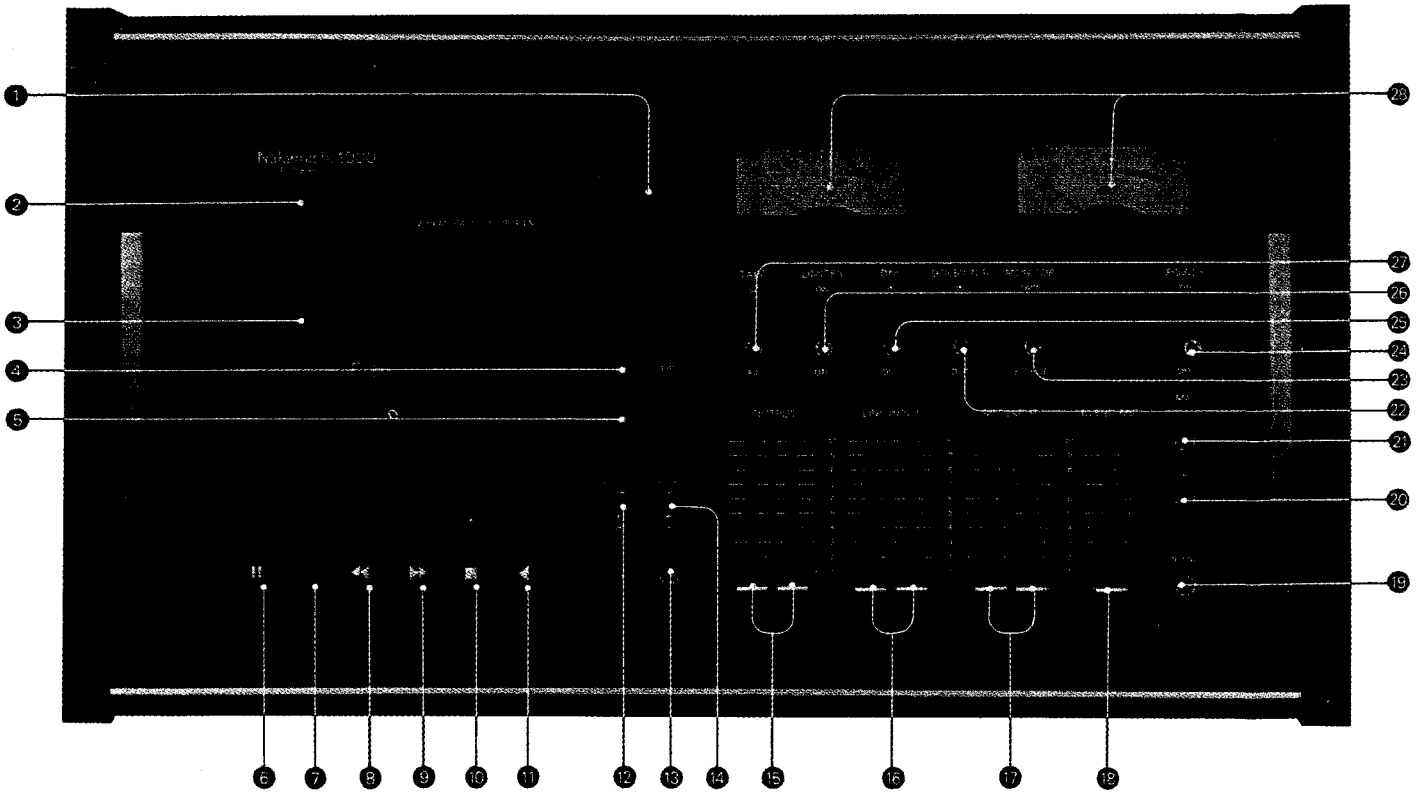
Printed by: Schaltungsdienst Lange, Berlin (GERMANY)

We thank you very much for your purchase of the Nakamichi 1000.
This recorder is designed especially for the professional use and is adaptable for the standard 19" rack.
The transport mechanism, heads and circuitry of the Nakamichi 1000 are the outcome of the highest state of art developed by Nakamichi Research Inc. and its performance is comparable to the professional quality 3-head reel-to-reel recorders.
Before using this recorder please read this instruction manual very carefully so that all functions and features will fully be used with the highest performance.

CONTENTS:

Control Functions 1
Connections 3
Playback Procedures 4
Before Recording 5
Level Calibration 6
Recommended Cassette Tapes and Tape Selector Switch 7
Record Procedures 8
Additional Recording and Playback Techniques 9
Peak Level dB Meter 10
Cassette Lid Removal and Lubrication 10
Double Noise Reduction System 11
Trouble Shooting Chart 12
Specifications 13
Optional Accessories 13

Control Functions



❶ Tape Run Indicator:
During recording/playback, a green lamp moves from right to left hand side showing the actual tape run.

❷ Adjustment Lid:
When you opened this lid, you will find functions such as the recording head azimuth adjust, test tone, and pitch control.

❸ Cassette Lid:
The Lid will be opened when the EJECT button is pushed.

❹ Eject Button

❺ Tape Counter

❻ Pause Button:
Used to momentarily stop the tape in recording or playback mode.
When depressed during recording, the recording circuits remain operative, and the capstan remains in motion but the pinch roller is retracted.

❼ Record Button:
Recording will be commenced when pushed simultaneously with the Play Button.

❽ Fast Forward Button:
Serves tape to move rapidly from right to left reel. When the tape reaches the end, depress the Stop Button or allow auto-stop to function.

❾ Rewind Button:
Serves tape to move rapidly from left to right reel.
Depress the Stop Button or allow auto-stop to function.

❿ Stop Button:
When pushed, the entire motions will stop.

⓫ Play Button:
Tape runs at the standard speed, and when you touch the Button, playback of the pre-recorded tapes will commence.

⓬ Auto Rewind Switch:
If you set the Auto Rewind Switch to "ON", the tape will stop at the tape-end and automatically be rewound to the other end.

⓭ Headphone Jack:
The headphones should have an impedance of 8ohm.

⓮ Tape Start Memory Switch:
If you set the tape counter to "000" at the start of each recording and set the Tape Start Memory Switch to "ON", then the tape will be rewound at the touch of the Rewind Button to the preset point and will stop.

⓯ Output (Line Output Level Controls):
The output level of monitoring sound from the tape or sound source can be controlled either in recording or playback.

⓰ Line Input Level Controls

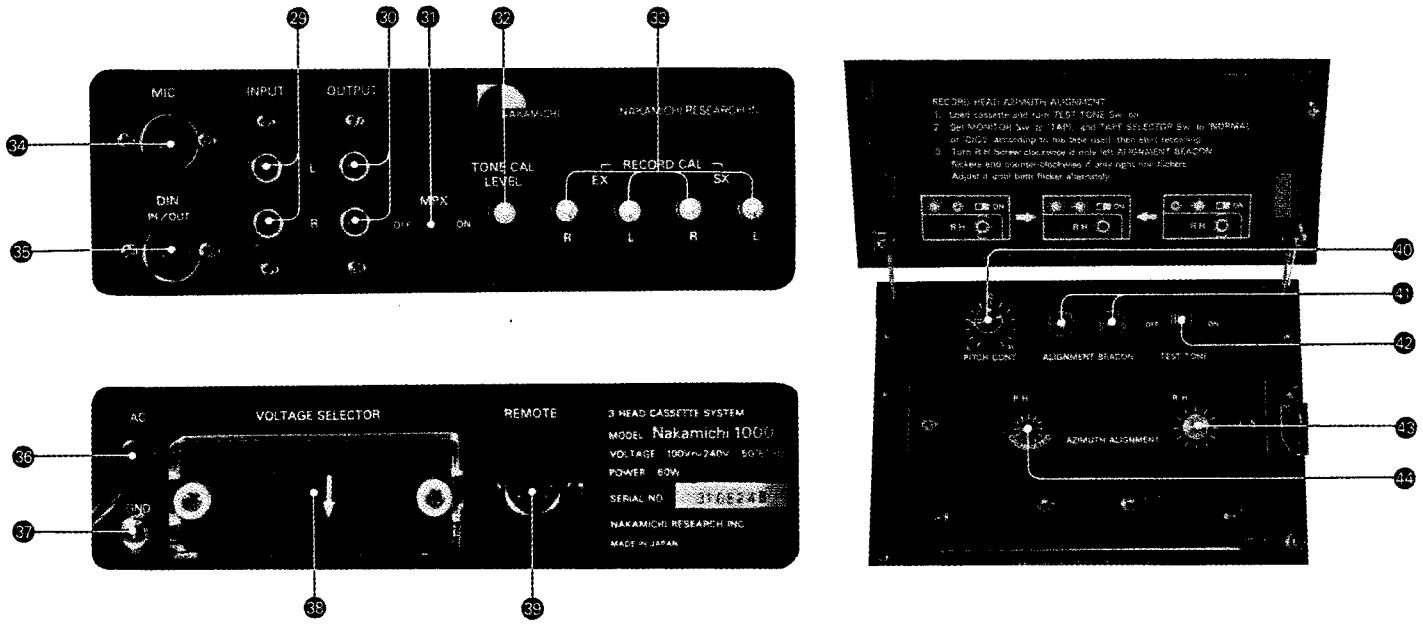
⓱ Mic Input Level Controls

⓲ Blend Mic Input:
These controls can be independently adjusted. The Mic Input Level Controls do not function unless microphones are plugged in. During recording from the line input the Mic Input Controls do not affect S/N Ratio.

⓳ Blend Mic Input Jack

⓴ Mic Input Jack R

㉑ Mic Input Jack L



㉒ Dolby NR Switch:
Set the DOLBY NR Switch to "IN" when you play back a recorded tape made under the DOLBY System, or when you make recording under it. This System is international, and recordings made under it can be reproduced by any cassette tape deck equipped with the same System, regardless of its make.

㉓ Monitor Switch:
Source
The input signals from the sound source can be directly monitored by adjusting the sound volume with the Line Input/Mic Input Controls.
Tape
To play back a recorded tape, set the Switch to "Tape".
In recording, instantaneous off-the-tape monitoring is possible so that it will permit instant comparison of the recording with the input signal.

㉔ Power Switch:
When you turn the Power Switch to "ON", the Level Meters, Tape Run Indicator and Stop Button will illuminate to show that the power is being supplied to the deck.

㉕ DNL (Dynamic Noise Limiter) Switch:
The DNL System is only effective in playback. By using it in combination with the DOLBY System, further improvement in noise suppression is available. The DOLBY System does not reduce high frequency noise contained in input signals. The DNL on the other hand effectively decreases such noise if it is used in playback of a recorded cassette made with or without the DOLBY System.

㉖ Limiter Switch:
After record level setting has been made, the Peak Limiter prevents distortion from sudden transient peaks in live recording.

㉗ Tape Selector Switch:
Set to "EX" for high output, Nakamichi EX, EX II tapes, and to „SX" for Nakamichi SX tape. Be sure of using tapes having proper bias level and equalization.

㉘ Peak Level Meter:
The Meters indicate a wide range from -40dB to +5dB, the 0dB of which conforms to the "DOLBY" NR Standard Level.

㉙ Line Input Jacks

㉚ Line Output Jacks

㉛ 19 KHz MPX Filter Switch

㉜ Test Tone Level Calibration

㉝ Record Level Calibration:
Enable you to set correct Dolby level for any cassette tape.

㉞ DIN Mic Input Socket:
DIN Connector must be of SM type.

㉟ DIN IN/OUT Socket:
To be connected with a DIN Cord.

㊱ AC Power Supply Cord

㊲ Ground Terminal

㊳ Voltage Selector Plug:
You can change over either to 100V, 117V, 220V or 240V.

㊴ Remote Control Socket

㊵ Pitch Control:
Standard Tape Speed of 1-7/8 ips. is set at click position in the center.

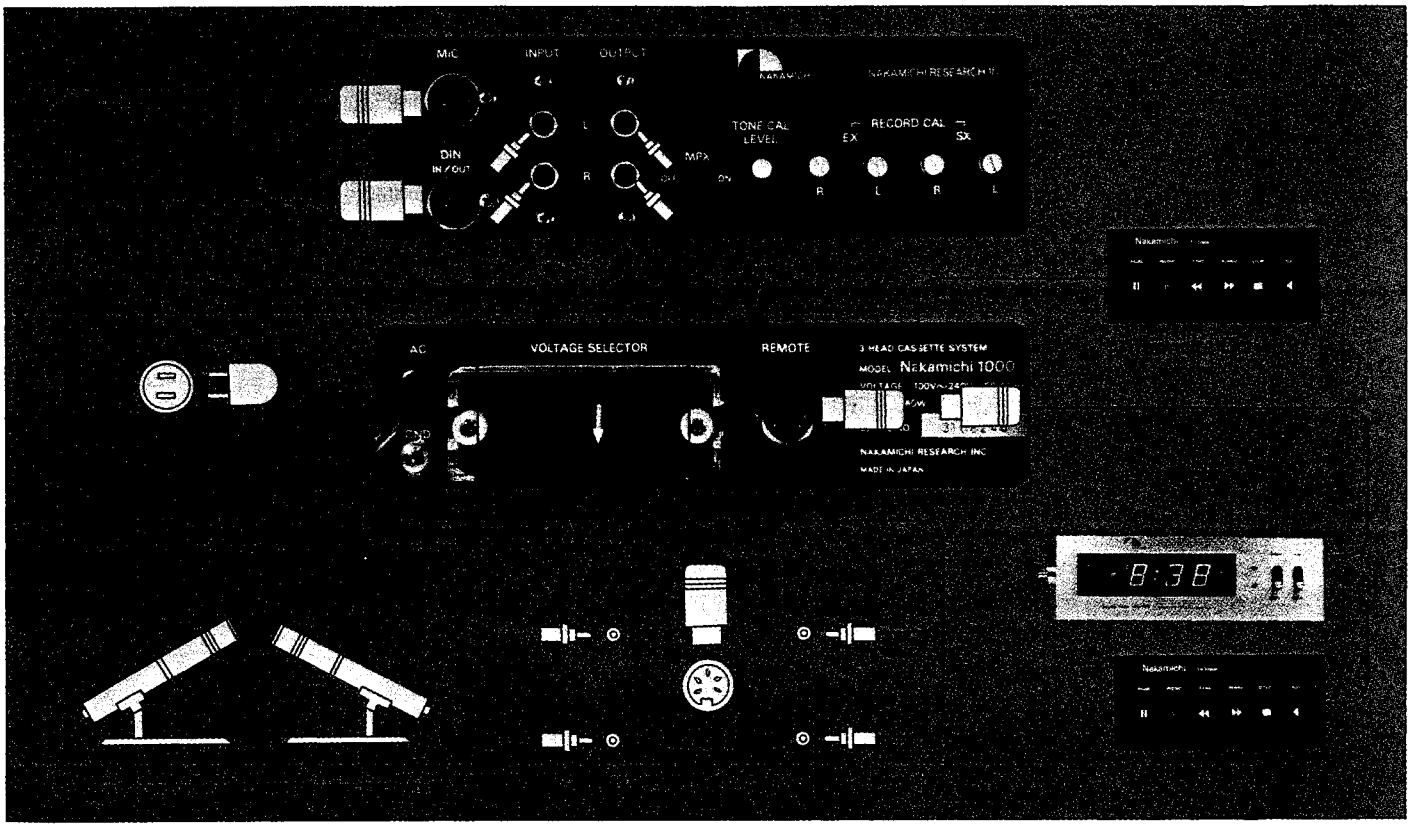
㊶ Alignment Beacon:
Enables to adjust the azimuth alignment of a recording head according to each cassette tape (Refer to "Before Recording").

㊷ Test Tone Switch

㊸ Record Head Azimuth Alignment

㊹ Playback Head Azimuth Alignment

Connections



Connecting the Line Output:

Connect to the Tape Monitor of your Stereo Amp or AUX Jacks from the Output Jacks through pin cords.

Connecting the Line Input:

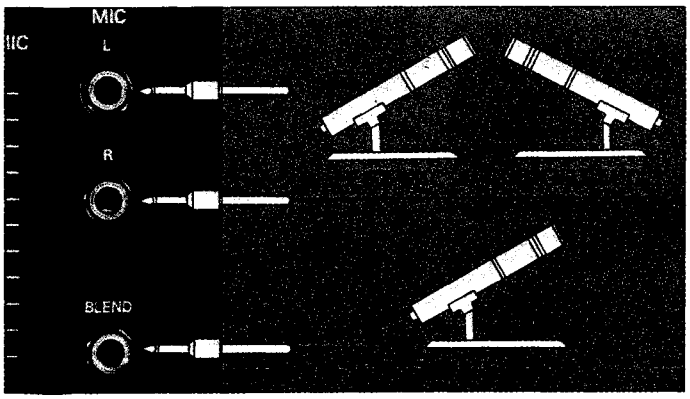
Connect to the Tape Rec Jacks of your Stereo Amp from the Input Jacks through pin cords.

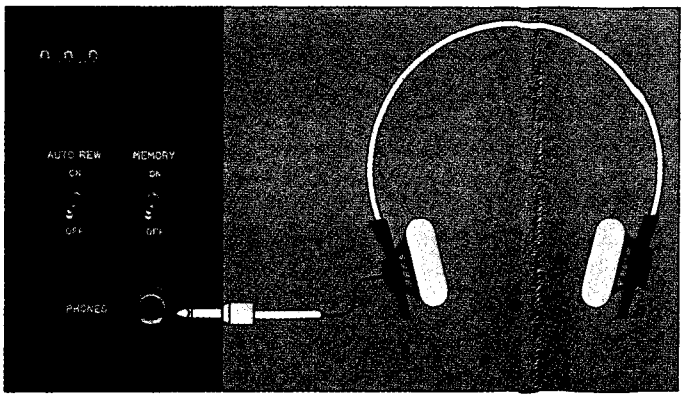
Connecting the DIN Connector Socket:

If your Stereo Amp is equipped with a DIN Connector Socket, connect with a DIN Cord. In this case, please do not use pin cords simultaneously.

Connection to Digital Timer:

Set the socket of a timer to "Remote". If you use a Remote Control, connect to the Remote Socket of the timer.





Microphones and Headphone:

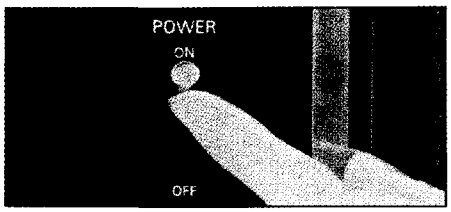
As shown in the above Fig., both of the right and left Stereo Microphones and the Blend Microphone can be connected.

Please use the microphones having impedance of 600 ohms.

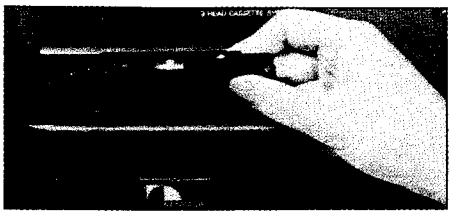
Insert the Stereo Headphones into the Headphone Jack as shown in the above Fig.

Please use the headphone having impedance of 8 ohms.

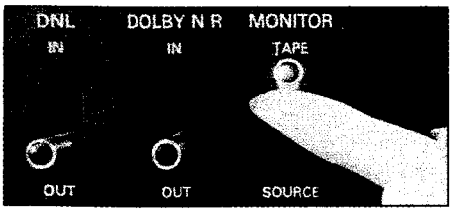
Playback Procedures



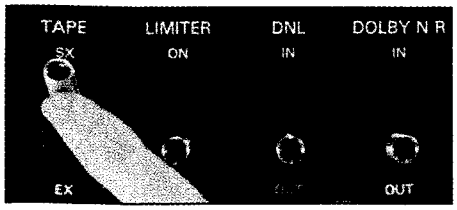
❶ Turn on the Power Switch. The level meters and the cassette compartment window will illuminate to indicate power supply to the deck. Also the "Stop" Button will light.



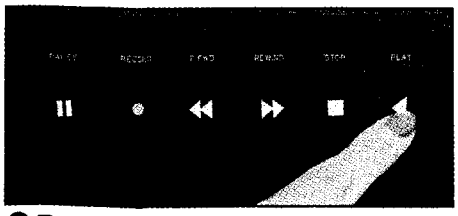
❷ Push the Eject Button and load a cassette, then close the cassette compartment lid.



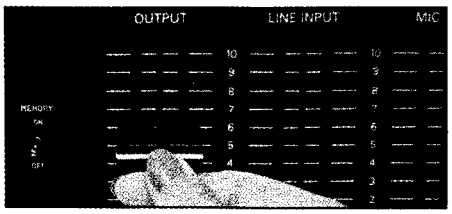
❸ Set the Monitor Switch to "Tape".



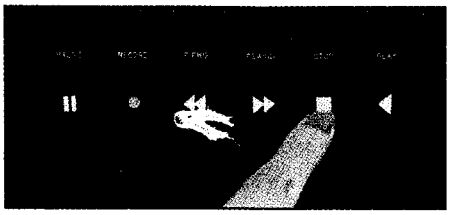
❹ Set the Tape Selector Switch to "EX" or "SX" according to the tape in use.



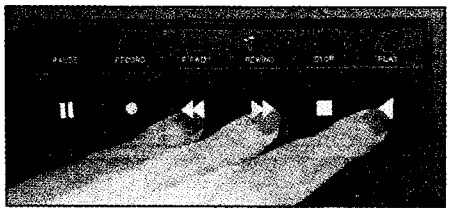
❺ Touch the Play Button to start the tape.



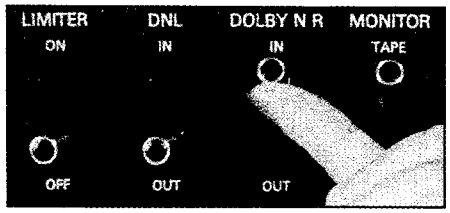
❻ Adjust the sound volume with the Output Level Controls.



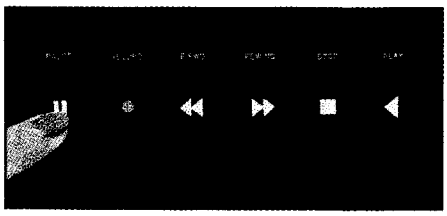
❼ To stop the tape, touch the Stop Button. If you push the Eject Button, the Cassette Compartment Lid will open to expose the cassette inside.



❽ It is not necessary to touch the STOP Button each time you rewind or fast forward the tape during playback.
Also you can change to the playback mode directly from the rewind or fast forward mode without causing damage to the tape.

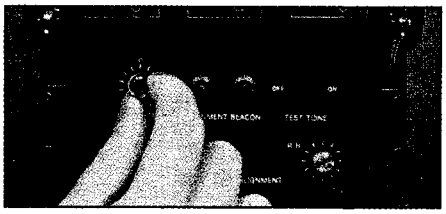


❾ If you play back a tape recorded under the "Dolby System", be sure to set the "Dolby NR" Switch to "IN".



❿ When you push the "PAUSE" Button, the tape run will stop momentarily.

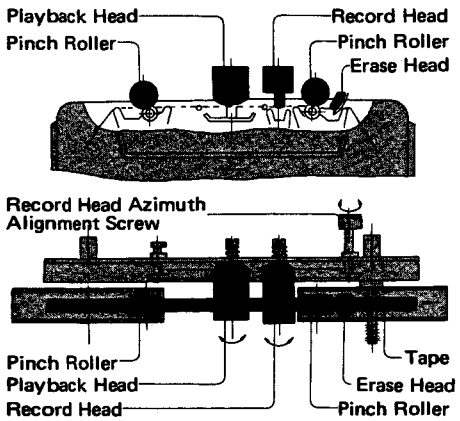
Pitch Control



Standard tape speed of 1-7/8 ips is set at click position in the center. Any speed within the range of ± 6% (half tone) can be selected by turning the knob to "L" direction for lower pitch and "H" direction for higher pitch.
The tape speed of 1-7/8 ips will be always maintained in recording, regardless of the position of the Pitch Control Knob.

Note:
* The Nakamichi 1000 is so designed that the Lid will not open, even if you push the "Eject" Button while the tape is running.
* When the tape reaches its end, it will stop automatically.
* The "Peak Limiter" Switch has no effect during playback.

Before Recording



Head Azimuth Alignment

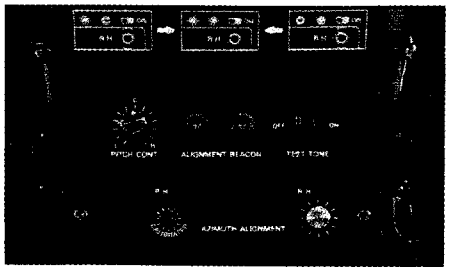
As shown in the above Fig. the Nakamichi 1000 is of a 3-head type wherein each of erase, recording and playback heads is individually installed. A part of a cassette housing in which a tape runs serves as a guide for tape run.
As a case may be according to each plastic moulding, the high frequency part may be lowered because of the inaccurate azimuth alignment of head slit between recording and playback heads.
Accordingly, it is recommended that you perform accurate azimuth alignment when you change a tape to another.

Azimuth Alignment Procedures

Record Head

❶ Load a cassette into the cassette compartment.
❷ Turn the Test Tone Switch on.
❸ Touch the RECORD Button and then the Play Button to start the tape.
❹ Set the Monitor Switch to "Tape".
❺ Adjust the Record Head Azimuth Alignment (RH) Screw so that the both Alignment Beacons flickers alternately. If only the left Alignment Beacon flickers, turn the RH Screw clockwise. And if only the right Alignment Beacon flickers, turn it counter-clockwise.

Caution:
It takes about 0.3 second until the Alignment Beacon responds to the turning of the RH Screw. It is necessary to turn the RH Screw little by little with a reasonable interval. If you turn it to the wrong direction, the Alignment Beacon will not flicker. The turning direction must be carefully determined according to the above instructions.



It is not a fault of the deck!

Anti-Tape Spill Device:

The Nakamichi 1000 is equipped with the tape spill sensing system which stops all the functions of the unit instantaneously when spill of the tape is about to start.
In case the functions of the unit stop automatically, please check the cassette tape first. The tape spill usually occurs with a second class cassette tape the housing of which is being moulded with less precision, and physical property of tape itself is rather poor.
Also a thinner tape such as C-120 cassette often causes heavy friction inside the cassette housing which will also be sensed by the said device.

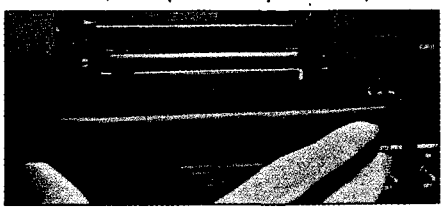
Heads Maintenance

(1) Playback Head

No Adjustment is necessary with respect to the playback head azimuth, since it is adjusted prior to delivery from our factory.

(2) Head Cleaning

All parts that come into contact with the tape must be frequently cleaned. Even the best tape formulations leave a deposit of oxide sheddings on the heads, pinch roller and capstan. Failure to perform a periodic cleaning of these parts can result in signal dropouts, loss of high frequencies and wow and flutter. A cleaning kit is supplied with the Nakamichi 1000, but some Q-tips and isopropyl alcohol (preferably undiluted) will perform quite adequately.



(3) Demagnetizing

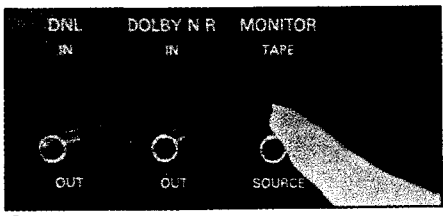
All metal parts that come into contact with the tape must be occasionally demagnetized to prevent the build-up of residual magnetism that can add hiss to and partially erase the high frequencies on a tape being played. Although the heads and capstan of Nakamichi caisette decks require demagnetization much less frequently than most other tape decks, it should nevertheless be performed once every 50 hours of use to be on the safe side. A Nakamichi Demagnetizer is recommended for this purpose since it is specially designed for ease of use with cassette decks, but any properly designed demagnetizer will do.

Remove all tapes from the vicinity of the tape deck before proceeding. Make sure the tape deck is "OFF." Turn the demagnetizer on and slowly bring the tip as close as possible to the record/play heads (it is not necessary to demagnetize the erase head). Do not make contact with the head unless the tip of the demagnetizer is covered with thin vinyl or rubber to avoid scratching the surface of the head (a piece of vinyl tape may be used to cover the tip if it is not already covered). Move the demagnetizer tip slowly in a random pattern about the surface of the head for at least 10 seconds and then slowly move it toward the capstan. Repeat with the capstan, and then slowly withdraw the demagnetizer. Turn it off after it is at least 2 feet from the deck. Never turn the demagnetizer off while it is close to the head or capstan as this may semi-permanently magnetize the metal part.

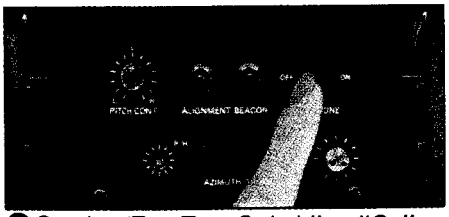
Level Calibration

Dolby NR Level Calibration

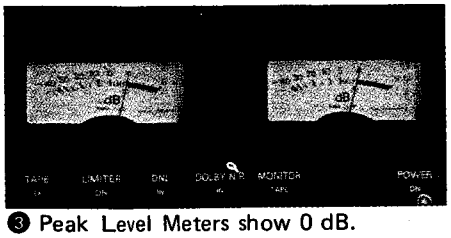
The Dolby NR standard level (200 nW/m) of the Nakamichi 1000 is set to 0 dB. Particularly, when you record with Dolby NR "In" adjust the 0dB signal of the built-in 400 Hz Test Tone to 0dB according to each of the tapes to be used.



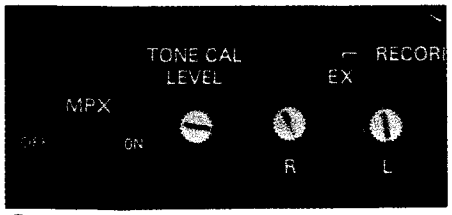
❶ Set the "Monitor Switch" to "Source".



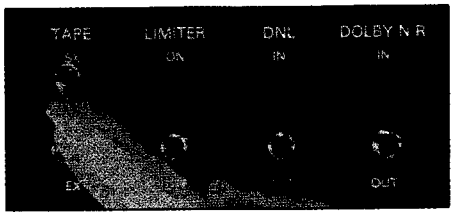
❷ Set the "Test Tone Switch" to "On".



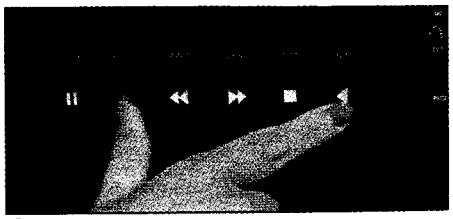
❸ Peak Level Meters show 0 dB.



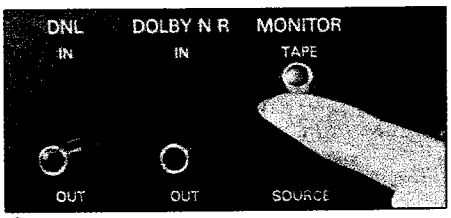
❹ If away from 0dB, adjust the Tone Cal Level to obtain the accurate 0dB.



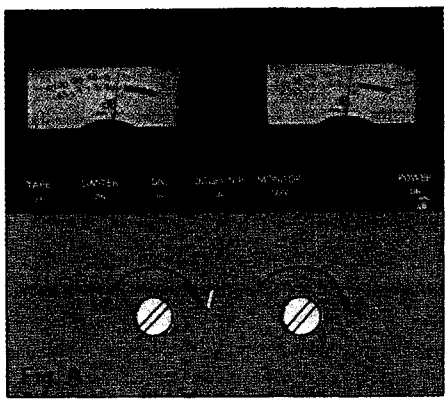
❺ Set the position of the Tape Selector Switch according to the type of the tape in use.

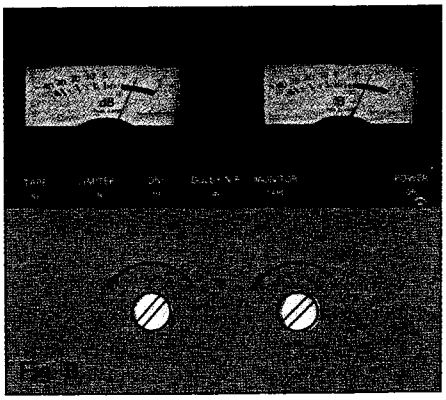


❻ Start the tape and record 400Hz.



❼ Set the "Monitor Switch" to "Tape".



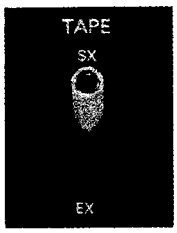
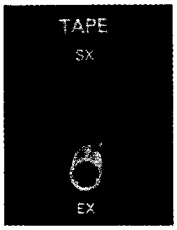


If the levels are not within 1 dB of "0 dB", adjust the appropriate Level Calibration Controls (Left or Right, EX or SX) clockwise or counter-clockwise (Fig. A or Fig. B) to obtain a 0 dB reading on both meters.

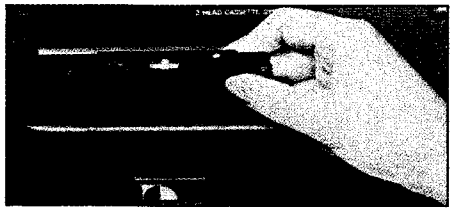
Note:
The recorder must be in the record mode with the "Monitor" switch in the "Tape" position in order to perform this calibration.

Recommended Cassette Tapes and Tape Selector Switch

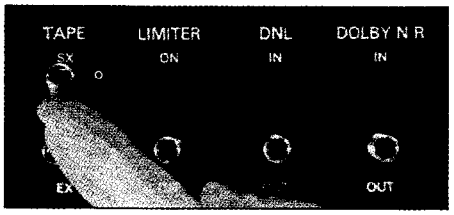
The tape selector switch on your Nakamichi cassette deck has been specially designed to simultaneously change both the Bias and Equalization. Although the unit has been factory adjusted for Nakamichi EX (or EX II) tape in the "EX" position and for Nakamichi SX tape in the "SX" position, certain other tapes shown in the recommendation table below may be used with excellent results. The "EX" position utilizes the standard 120 microsecond equalization and a "high" bias (approximately 10% higher than normal) compatible with a variety of low-noise/high-output/high-density formulations. The "SX" position utilizes the "high resolution" 70 microsecond equalization and a special bias (approximately 45% higher than normal) which allows the use of high coercivity tapes. To realize the full potential of your Nakamichi cassette deck, it is recommended that you use one of the following cassette tapes (tapes other than Nakamichi are listed in alphabetical order):

Position of Tape Selector Switch	Brand	Type or Model	
SX 	Nakamichi	SX	C-60, C-90
	TDK	SA	C-60, C-90
EX 	Nakamichi	EX	C-60, C-90
	Nakamichi	EX II	C-60, C-90
	Fuji	FX	C-60, C-90
	Maxell	UD	C-60, C-90
	Maxell	UDXL	C-60, C-90
	TDK	Audua	C-60, C-90

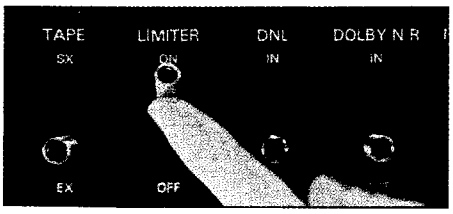
Record Procedures



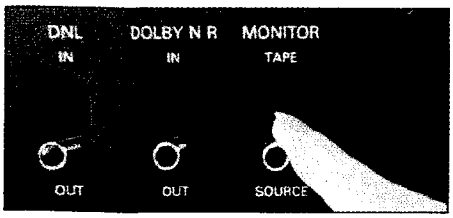
❶ Load a cassette as instructed before.



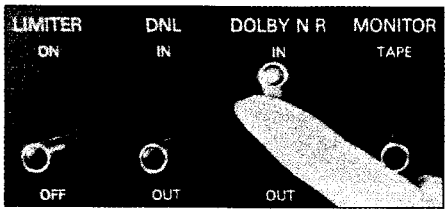
❷ Set the Tape Selector Switch according to the type of tape in use, to "SX" for a Nakamichi SX tape only and to "EX" for the other tapes such as Nakamichi EX, EXII tapes.



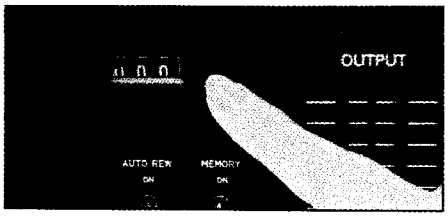
❸ For recordings of sound with wide dynamic range, set the Limiter Switch to "On" then the peak limiter prevents distortion from sudden transient peaks.



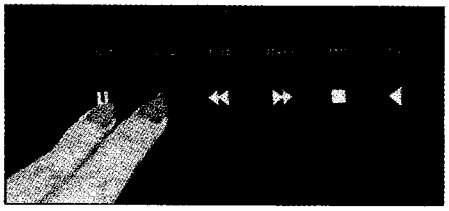
❹ Set the Monitor Switch to "Source" and adjust the recording volume levels with Line Input/Mic Input Level Control.



❺ Set the Dolby NR Switch to "IN" for recordings free from hiss noise.



❻ Push the Reset Button to reset the Tape Counter to "000".

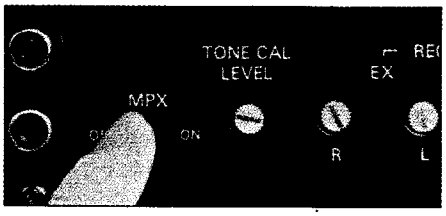


❼ Touch the Record Button and then touch the PAUSE Button while keeping your finger tip on the former. The red lamp will light to show that the deck is in the recording mode. At another touch on the PLAY Button, the tape will instantly start running to record.
Touch the PAUSE Button whenever you want to stop the tape without cancelling the recording mode.

❽ Touch the Stop Button to release the recording mode and then the tape will stop.

❾ By setting the Monitor Switch to "Tape" instantaneous off-the-tape monitoring during recording is possible.

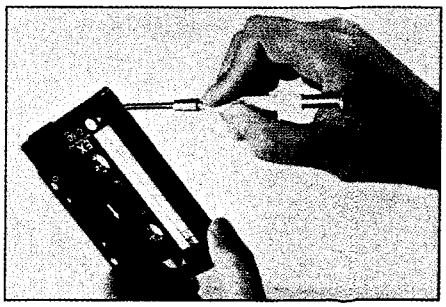
❿ If you set the tape counter to "000" at the start of each recording, and set the Memory Switch to "ON", then the tape will be rewound to preset point and stop at the touch of the Rewind Button.



⓫ When recording from FM Stereo Braodcasting, set the MPX Filter at the rear panel to "ON".

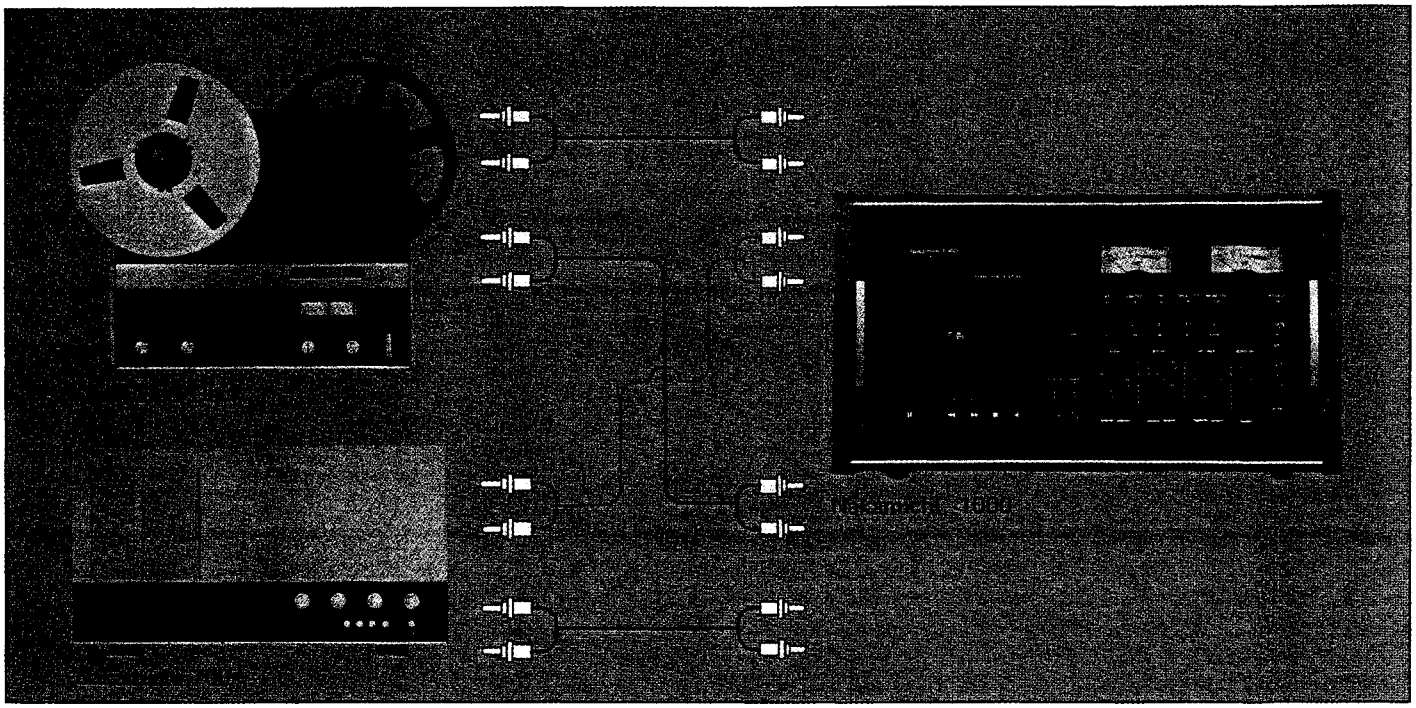
Note:
1. The DNL is effective only in the playback mode.
2. The Monitor Switch can be switched over to "Tape" or "Source" at any time during recording.
3. To prevent an accidental erasure of a recorded cassette, break off the tabs on the side opposite to that exposing the bare tape with a screw driver or the likes.

A cassette has "Tabs" on the side opposite to that exposing the bare tape. If you break them off with a screwdriver or the likes, the cassette will prevent the depression of the Record Button, thus eliminating the possibility of erasing a valuable recorded cassette by mistake.
Take advantage of this feature when you wish to preserve a cassette into which you have made recordings. If you wish to preserve the recording in only one side, break only one of the tabs.

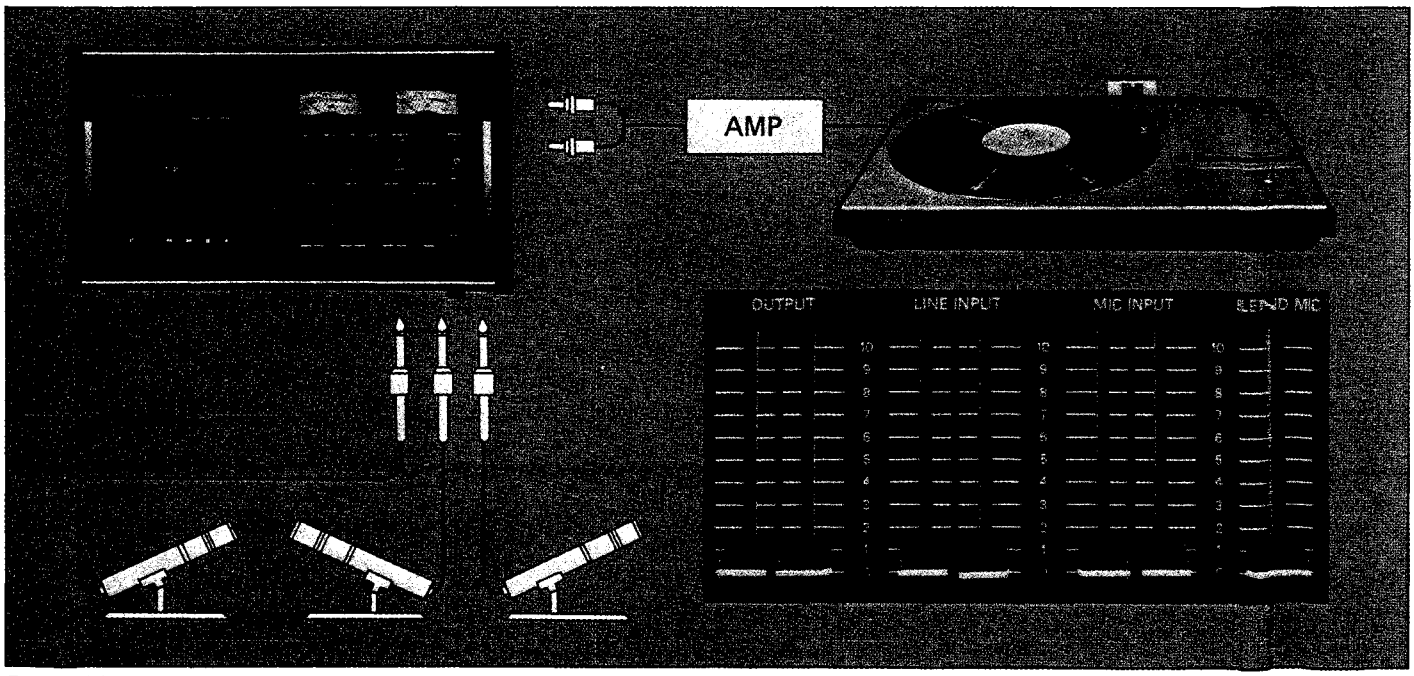


Note:
Should you ever want to make a recording into a cassette with such tabs already broken, seal the tab openings with masking tape or plug it with an erasure rubber, etc.

Additional Recording and Playback Techniques

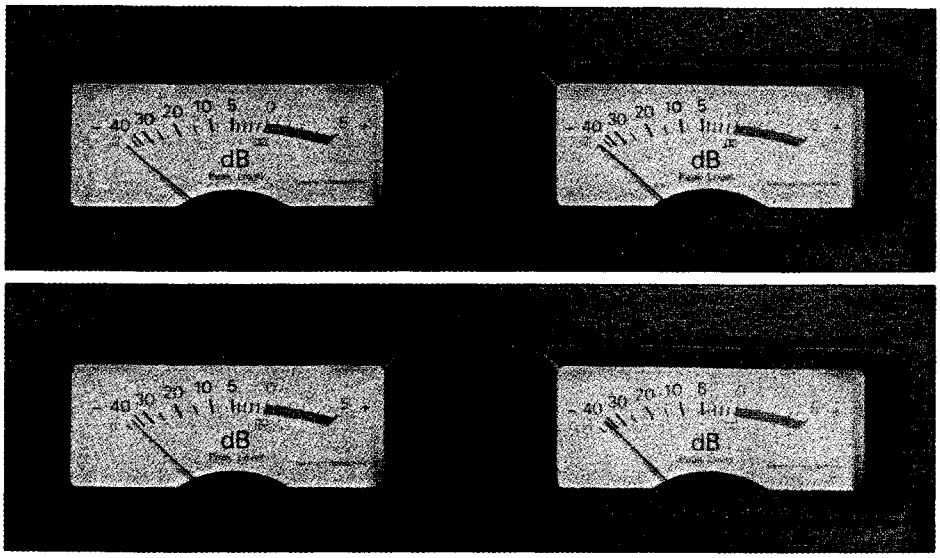


Direct Copying from Tape to Tape:
You can perform Hi-Fi recording from open reels and high quality cassette deck, alike the original source.

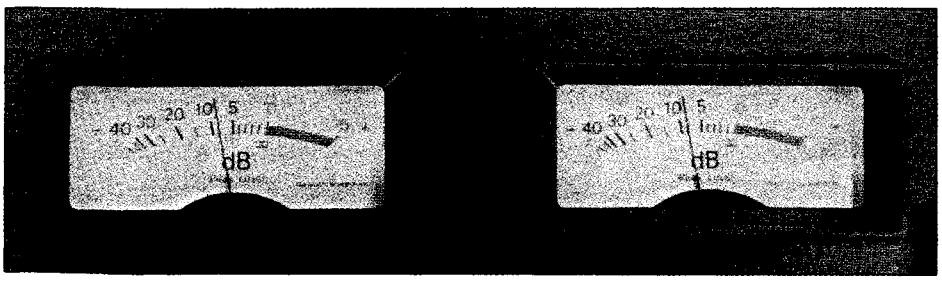


Record Mixing:
The Nakamichi 1000 serves also as a small type mixer through 5 different individual volume controls, namely Line Inputs Left and Right, Microphone Inputs Left and Right, and Blend Microphones. As shown in the Fig below, the mixing of a disc record with microphones, and also microphones L, R with Blend (L + R) microphone can be conducted.

Peak Level dB Meter

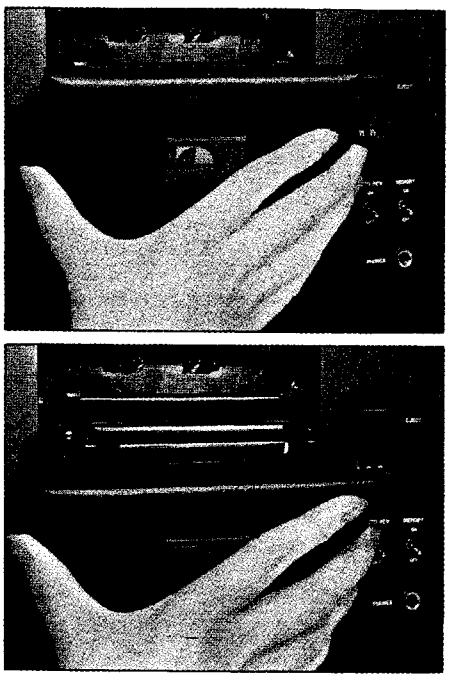


The Nakamichi 1000 incorporates true Peak Reading Level Meters which cover a wide range of -40 to plus 5 dB. The needles will move from the "Off" indication to the (infinity mark) mark when the power is turned on. Since the Peak Level Meters are able to accurately indicate sudden musical peaks, it is possible to record with the needles reaching 0 dB (occasionally even a bit higher depending on the type of tape in use and the type of source material being recorded) without distorting the recording.



When dubbing onto the Nakamichi 1000 from a 15 ips/2 track open reel recorder, it is suggested that the red mark at -8 dB on the Peak Level Meters be used as a guideline for the setting of record levels. Play a 0 dB or 0 VU test tone on the open reel deck. Set the input levels on the Nakamichi to the red mark (-8 dB). This will provide compensation for the fact that the 15 ips/2 track recorder has greater headroom. Exact levels may deviate from this suggested starting point since open reel recorders vary in available headroom as do the recording practices of open reel users. For 7-1/2 ips open reel tapes try -5 dB as a starting point = -2 dB for 3-3/4 ips.

Cassette Lid Removal and Lubrication

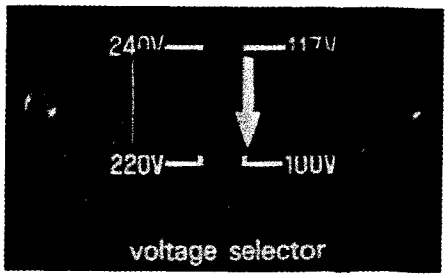


To Remove Cassette Lid:

Push the Eject Button. Pull the lid up until it gets unlocked, then pull it forward. To fix it on, push the lid down until it gets locked.

Lubrication:

The moving parts of the Nakamichi 1000 transport are fitted with oil-less bearings. It is not necessary for the user to provide lubrication.



On the Power Supply Voltage:

While your Nakamichi Tri-Trace is adjusted to the power supply voltage of your country prior to shipment from our factory, it may be readjusted to one of the four voltages. 100, 117, 220 and 240V .. should you ever move to an area where the power supply voltage is different. No adjustment is necessary with respect to the frequency of the power.

Double Noise Reduction System

The Nakamichi 1000 incorporates the 2 Famous Noise Reduction Systems, namely the Dolby Noise Reudction System and DNL (Dynamic Noise Limiter) developed by Philips, which enable to surpress unimaginable noise level.

Dolby NR

Your Nakamichi 1000 incorporates the Dolby Noise Reduction System (under license from Dolby Laboratories, Inc.) originally developed to produce a master tape from which to cut records with a high signal-to-noise ratio.

Noise heard from a recorded cassette primarily comprises tape noise and the noise produced by the playback equalizer amplifier of the cassette tape deck, and is largely distributed over a 2KHz to 10KHz range. Such noise can be effectively reduced by amplifying signals within this range at the time of recording, then attenuating them in playback, through a process as illustrated in Fig. 1.

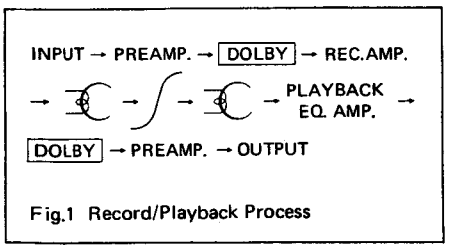


Fig.1 Record/Playback Process

This treatment is given to such signals regardless of their strengths, however, strong high-frequency signals cannot be recorded. So it is necessary to change the gain of this special circuit with respect to the strength of the high-frequency signals. The Dolby circuit makes this possible.

For instance, if high-frequency signals of −40dB enter the Dolby circuit from input terminals, it delivers signals of −30dB for recording on to the tape. Conversely, if high-frequency signals of −30dB enter the same circuit from the playback head (Fig. 2), it delivers signals of −40dB for reproduction from the stereo amplifier.

Thus input/output signals are attenuated by 10dB, with equivalent reduction in the level of tape noise and equalizer amplifier noise. The circuit is designed so that it does not affect signals of −5dB or greater.

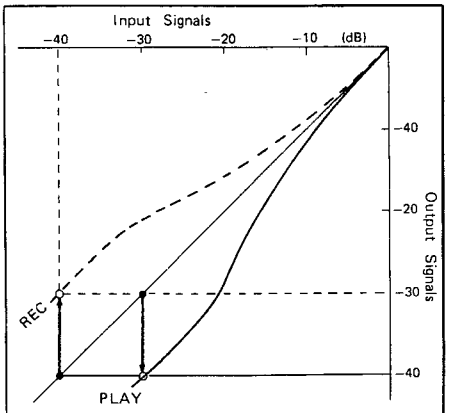


Fig.2 Working Principle of Dolby NR Circuit

As is clear from the foregoing explanation, the signal-to-noise ratio of sound improves by about 10dB if it is recorded and reproduced through the Dolby circuit, enabling you to enjoy clean, transparent hi-fi stereo sound. This system is international, and recordings made under it can be reproduced by any cassette or reel-to-reel tape decks equipped with the same system, regardless of their makes.

DNL (Dynamic Noise Limiter)

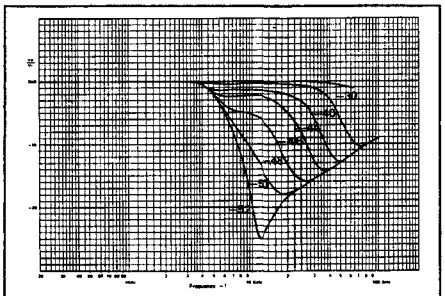


Fig. 4 DYNAMIC NOISE LIMITER : Steady-state characteristics. Parameter : Level Vi in dB, 0 dB = 780mV.

When set to "On", DNL operates only while playback. It also operates at Source Monitor but has nothing to do with recording. As shown in the above Fig, DNL serves lowering more noise where level is low, it further decreases noise while the Dolby NR and S/N Ratio are in the preferable condition.

The detailed data are shown below for your ready perusal wherein decrease of only 3dB will result in a great effect from the acoustic standpoint.

It also gives an effect when hiss noise or scratch noise is noted from the source.

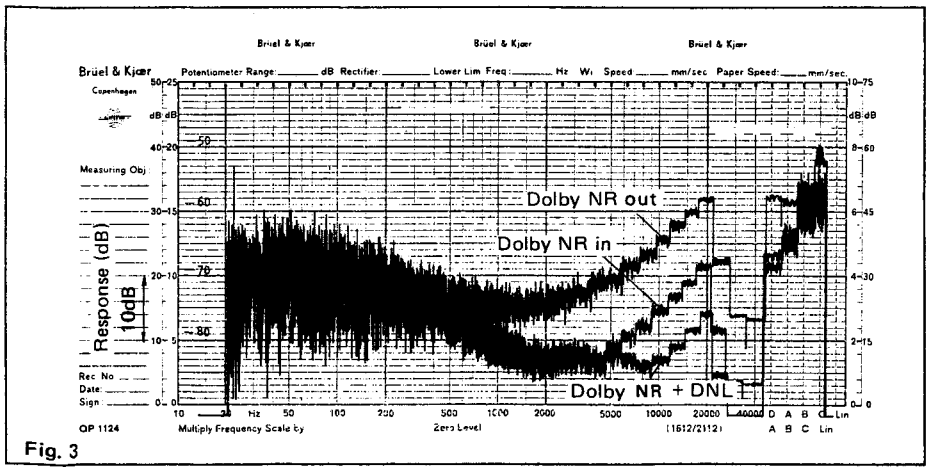


Fig. 3

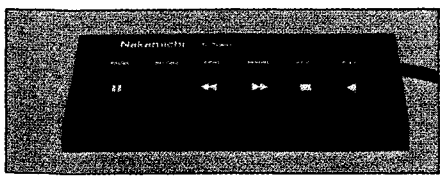
Trouble Shooting Chart

CONDITION	PROBABLE CAUSE	REMEDY
Tape does not run.	1. Power cord is unplugged. 2. Tape is loose inside cassette. 3. Cassette lid is not firmly closed.	Plug in power cord firmly. Wind tape up. Take out cassette and reset it carefully.
RECORD Lamp does not light.	1. Cassette is not loaded. 2. Cassette tabs are broken off. 3. PAUSE Button is touched.	Load cassette. Place a piece of adhesive tape over the tab opening. Release Pause mode.
Hissing sound is heard in playback.	1. Head is magnetized.	Demagnetize head with a head demagnetizer.
Tape travel is unsteady.	1. Capstan shaft and/or pinch roller are dirty. 2. Tape winding inside cassette or tape guides are faulty.	Clean those parts. Replace cassette.
Previously recorded sound remains.	1. Erase head is contaminated.	Clean the erase head and pinch roller.
Reproduced sound is distorted.	1. Program material itself is distorted. 2. Recording volume levels are too high.	Examine program material. Adjust appropriate recording level controls. In case it is distorted at transient peaks, turn on the Peak Limiter Switch.
Cannot record.	1. Connection to each part is incorrect. 2. Record head is contaminated.	Check connections. Clean head.
Cannot reproduce.	1. Connection to each part is incorrect. 2. Monitor switch is set to "SOURCE". 3. Playback head is contaminated.	Check connections. Switch over to "TAPE". Clean head.
Treble tones are weak.	1. Record head azimuth is not adjusted precisely.	Adjust azimuth to match the cassette used.
Large hum noise is heard in recording or playback.	1. Disturbing induction field exists nearby the deck. 2. Connector cord grounding is defective.	Keep away from amplifier, transformer, fluorescent lamp, etc. Use the perfect connector cord.

Specifications

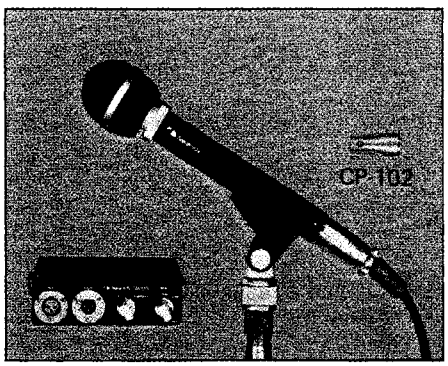
Power Supply	100, 117, 220, 240V 50/60 Hz
Power Consumption	60W Max.
Tape Speed	1-7/8 ips. ± 1%
Wow & Flutter	Less than 0.1% (DIN 45507 Weighted Peak)
Frequency Response	35 - 20,000 Hz ± 3 dB (Dolby NR In, SX or EX II Tape)
Signal to Noise Ratio	Better than 65 dB (Dolby NR In, Wrms, CCITT, 400Hz, 3% Distortion)
Total Harmonic Distortion	Less than 1.5% (at 400Hz, 0 dB)
Erasure	Better than 60 dB (at 1 KHz, Saturation Level)
Channel Separation	Better than 35 dB (at 1 KHz, 0 dB)
Cross Talk	Better than 60 dB (at 1 KHz 0 dB)
Bias Frequency	105 KHz
Transistors	134 pcs.
Diodes	68 pcs.
ICs	9 pcs.
Input:	
Mic Input	0.5mV 600ohm
Blend Mic	0.5mV 600ohm
DIN Mic Input	0.6mV 600ohm
Line	100mV 47Kohm
DIN Radio	10mV 27Kohm
Output:	
Line	1.0V (Max.) Variable
DIN Line Output	1.0V (Max.) Variable
Headphones	1 mW 0 dB
Dimensions	20-11/16"(W) x 11-11/16"(H) x 8-5/8"(D)

- Specifications and appearance design are subject to change for further improvement without notice.
- Dolby NR under license from Dolby Laboratories Inc.
- The word "DOLBY NR" and the Double-D-Symbol are trademarks of Dolby Laboratories Inc.



Remote Controller

DS-170 Digital Timer



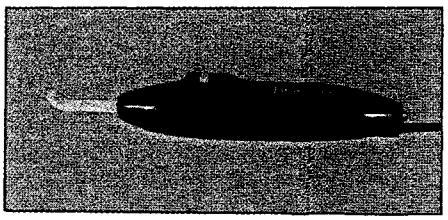
Condenser Microphone CM-1000
CP-101 capsule CP-102 capsule option

Optional Accessories

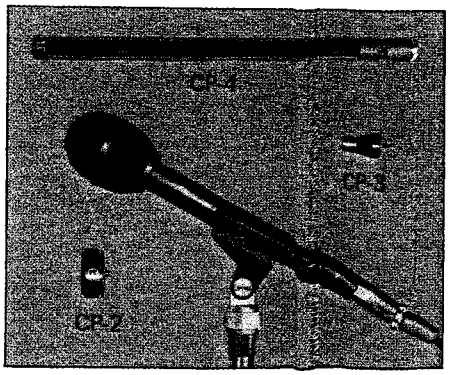
SX Tape C-60, C-90

EX-II Tape C-60, C-90

EX Tape C-60, C-90



DM-10 HEAD Demagnetizer



Electret Condenser Microphone
CM-300
CP-1 capsule
CP-2 capsule
CP-3 capsule option
CP-4 capsule option